

Evaluation of the MICAST#2-12 Al-7wt%Si Sample Directionally Solidified Aboard the International Space Station

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The US team of the European led “Microstructure Formation in CASTing of Technical Alloys under Diffusive and Magnetically Controlled Convective Conditions” (MICAST) program recently received a third Aluminum – 7wt% silicon alloy that was processed in the microgravity environment aboard the International Space Station. The sample, designated MICAST#2-12, was directionally solidified in the Solidification with Quench Furnace (SQF) at a constant rate of 40 $\mu\text{m}/\text{s}$  through an imposed temperature gradient of 31K/cm. Procedures taken to evaluate the state of the sample prior to sectioning for metallographic analysis are reviewed and rational for measuring the microstructural constituents, in particular the primary dendrite arm spacing ( $\lambda_1$ ), is given. The data are presented, put in context with the earlier samples, and evaluated in view of a relevant theoretical model.